



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,479	07/31/2001	J. Thomas Vaughan	600.499US1	3915

21186 7590 05/21/2003

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER

VARGAS, DIXOMARA

ART UNIT	PAPER NUMBER
----------	--------------

2859

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/919,479

Applicant(s)

VAUGHAN ET AL.

Examiner

Dixomara Vargas

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-66 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

- 11) ☒ The proposed drawing correction filed on 03 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-60, 63 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Srinivasan et al (US 6,029,082) in view of Meaney et al. (US 5,841,288).

With respect to claims 1-5 and 60, Srinivasan discloses an apparatus comprising: a volume coil as seen on figure 2, including a plurality of current elements (#90, #92 and #94), the volume coil having an aperture formed by removal or displacement of one or more current elements from a regular or symmetric pattern or arrangement of current elements (opening #44 on Figure 2). Also, Srinivasan discloses the claimed invention as stated above except for

Art Unit: 2859

specifying that each current element includes a transmission line segment having a first current path and a parallel return current path for the first current path. However, Meaney discloses the transmission line segments having a first current path and a parallel return current path for the first current path (Figures 4-5b, wherein the transmission lines are #113 inside the apertures #111). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Meaney's transmission lines in Srinivasan coil structure for the purpose of increasing the amount of measurement data of the selected region in the predetermined time with a multi-tuned or variably tuned coil.

4. With respect to claim 6, Srinivasan discloses a static-field magnetic field unit having a bore, the radio frequency magnetic field unit inserted in the bore to form an imaging unit (Figure 1).

5. With respect to claim 7, Srinivasan discloses each of the plurality of current elements is inductively coupled to at least one of the plurality of current elements (Figures 3 and 4).

6. With respect to claim 8, Srinivasan discloses the each of the plurality of current elements is capacitively coupled to at least one of the plurality of current elements (Figures 3 and 4).

1. With respect to claims 9 and 12, Srinivasan discloses an apparatus comprising: a radio frequency magnetic field unit to generate a desired magnetic field as seen on Figure 2, the radio frequency magnetic field unit having a first aperture formed at an end of the radio frequency magnetic field unit and a second aperture that is substantially unobstructed, wherein the first aperture is contiguous to the second aperture (Figure 2, opening #44 is sub-divided).

2. With respect to claim 10, Srinivasan discloses the second aperture has an arc having an arc length of between about  $0^{\circ}$  and about  $90^{\circ}$  (Figure 2, opening #44).

3. With respect to claim 11, Srinivasan discloses a static-field magnetic field unit having a bore, the radio frequency magnetic field unit inserted in the bore to form an imaging unit (Figure 1).
4. With respect to claim 13, Srinivasan discloses the radio frequency magnetic field unit comprises a substantially cylindrical volume having a curved arrangement of current elements with the first side aperture and the second side aperture located along the curved arrangement and the first side aperture located substantially opposite from the second side aperture (Figures 2, 4 and 6).
5. With respect to claim 14, Srinivasan discloses the first side aperture has a first width and the second side aperture has a second width that is about equal to the first width (Figures 2, 4 and 6).
6. With respect to claim 15, Srinivasan discloses a static-field magnetic field unit having a bore, the radio frequency magnetic field unit inserted in the bore to form an imaging unit (Figure 1).
7. With respect to claims 16 and 18, Srinivasan discloses a method comprising: removing one current element from a first radio frequency magnetic field unit to form a second radio frequency magnetic field unit having an aperture (Figures 2 and 4).
8. With respect to claims 17 and 19, Srinivasan discloses calculating and implementing a set of currents to generate a desired magnetic field in the second radio frequency magnetic field unit (Column 6, lines 27-50).
9. With respect to claim 20, Srinivasan discloses a method comprising: removing two oppositely positioned current elements circuits from a first radio frequency magnetic field unit to

Art Unit: 2859

form a second radio frequency magnetic field unit having a first aperture and a second aperture (Column 7, lines 32-45; Figures 2 and 6).

10. With respect to claim 21, Srinivasan discloses the remaining pattern or arrangement of current elements is capable of producing a desired field and the desired field is restored, compensated or otherwise effected by adjustment of currents in the plurality of current elements (Column 6, lines 11-50).

11. With respect to claim 22, Srinivasan discloses the volume coil includes a top and one or more of the regular or symmetric pattern or arrangement of current elements is removed from the top for improved access from the top and the desired field is restored (Figures 2 and 6).

12. With respect to claim 23, Srinivasan discloses the volume coil includes an open end and a closed end, the closed end being closed by a conductive plane (Figures 2 and 6).

13. With respect to claim 24, Srinivasan discloses the volume coil includes two open ends (Figures 2 and 6).

14. With respect to claim 25-28, Srinivasan discloses the volume coil capable of being used in head imaging (Figure 2).

15. With respect to claim 29, Srinivasan discloses the volume coil is capable of being used in extremity imaging (Figure 6).

16. With respect to claim 30, Srinivasan discloses the volume coil is capable of being used in foot and ankle imaging (Figure 6).

17. With respect to claim 31, Srinivasan discloses the volume coil includes an impedance and the impedance is adjusted to control current in the plurality of current elements (Column 6, lines 11-50).

18. With respect to claim 32 and 33, Srinivasan discloses the impedance is adjusted by adjusting a capacitance (Column 6, lines 11-50).
19. With respect to claims 34, 36 52 and 54, Srinivasan discloses a radio frequency conductive front end ring coupled to the plurality of current elements and a radio frequency conductive back plane coupled to the plurality of current elements (Figures 2 and 6).
20. With respect to claims 35, 37, 53 and 55, Srinivasan discloses a radio frequency conductive front end ring including a gap, the radio frequency conductive front end ring coupled to the plurality of current elements and a radio frequency conductive back plane coupled to the plurality of current elements (Figures 2 and 6).
21. With respect to claims 38 and 56, Srinivasan a slotted shield or cavity wall coupled to the plurality of radio frequency current elements (Figure 2).
22. With respect to claim 39, Srinivasan discloses a window or aperture in shield or cavity in approximate line with missing or displaced element or elements (Figure 2).
23. With respect to claim 40, Srinivasan discloses the volume coil includes an open end and a closed end, the closed end being closed by a conductive plane (Figures 2, 4 and 6).
24. With respect to claim 41, Srinivasan discloses the volume coil includes two open ends (Figures 2 and 6).
25. With respect to claim 42, Srinivasan discloses includes a top and one or more of the regular or symmetric pattern or arrangement of current elements is removed from the top for improved access from the top (Figure 2 and 6).
26. With respect to claims 43-45, Srinivasan discloses the volume coil capable of being used in head imaging (Figure 2).

Art Unit: 2859

27. With respect to claim 46, Srinivasan discloses the volume coil is capable of being used in body imaging (Column 7, lines 31-60).
28. With respect to claims 47 and 48, Srinivasan discloses the volume coil is capable of being used in extremity imaging (Figure 6).
29. With respect to claim 49, Srinivasan discloses the volume coil includes an impedance and the impedance is adjusted to control current in the plurality of current elements (Column 6, lines 11-50).
30. With respect to claim 50, Srinivasan discloses the impedance is adjusted by adjusting a capacitance (Column 6, lines 11-50).
31. With respect to claim 51, Srinivasan discloses the impedance is adjusted by adjusting an inductance (Column 6, lines 11-50).
32. With respect to claim 57, Srinivasan discloses means to actively detune/retune the volume coil for use with a local receiver coil (Column 6, lines 50-62; Figure 1).
33. With respect to claims 58 and 59, Srinivasan discloses the volume coil is double tuned or multiple tuned (Column 6, lines 50-62).
34. With respect to claim 63, Srinivasan discloses one or more apertures formed on a side of the radio frequency magnetic field unit to permit access to a subject's ears (Figure 2).
35. With respect to claim 66, Srinivasan discloses the radio frequency magnetic field unit includes a top-half and a bottom-half, the top-half capable of being mechanically attached and detached to the bottom-half at the first side aperture or the second side aperture (Column 7, lines 31-60; Figure 6).



Art Unit: 2859

36. Claims 61 and 62, are rejected under 35 U.S.C. 103(a) as being unpatentable over Srinivasan et al. (US 6,029,082) in view of Meaney et al. (US 5,841,288) and further in view of Yui et al. (US 5,892,359).

With respect to claims 61 and 62, Srinivasan and Meaney disclose the claimed invention as stated above in paragraphs 3-35 except for a mirror or prism mounted over the window or aperture. However, Yui discloses the use of a mirror in an MRI coil structure (Figure 19, #119). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Yui's mirror in Srinivasan and Meaney's apparatus for the purpose of giving the patient a less-claustrophobic environment by allowing to see outside the apparatus through a mirror.

37. Claims 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Srinivasan et al. (US 6,029,082) in view of Meaney et al. (US 5,841,288) and further in view of Ziarati (US 5,877,732).

38. With respect to claim 64, Srinivasan and Meaney disclose the claimed invention as stated above in paragraphs 3-35 except for an auditory communication device to communicate through the one or more apertures. However, Ziarati discloses the auditory communication system (Figure 2; Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ziarati's auditory communication system in Srinivasan and Meaney's apparatus for the purpose of improving the examination of the subject by allowing the communication between the patient and the operator since the operator will be able to instruct the patient inside the bore.

Art Unit: 2859

39. With respect to claim 65, Srinivasan and Meaney disclose the claimed invention as stated above in paragraph 3 except for the communication device provides active or passive auditory protection. However, Ziarati discloses the auditory communication system (Figure 2; Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ziarati 's auditory communication system in Srinivasan and Meaney's apparatus for the purpose of improving the examination of the subject by allowing the communication between the patient and the operator since the operator will be able to instruct the patient inside the bore.

#### *Response to Arguments*

40. Applicant's arguments with respect to claims 1-66 have been considered but are moot in view of the new ground(s) of rejection.

#### *Conclusion*

41. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art cited in the PTO 892 discloses different configurations of a volume coil with transmission lines.

42. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

Art Unit: 2859

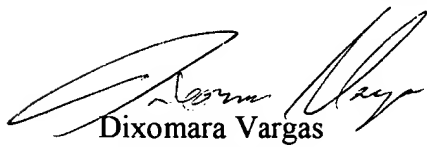
MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (703) 305-5705.

The examiner can normally be reached on 8:00 am. to 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (703) 308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0956.



Dixomara Vargas  
Art Unit 2859  
May 19, 2003



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800